

Use of Assets in Large and Mid-Size Corporations: An Econometric Analysis of the Manufacturing Sector Using Schedule M-3 Data

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In this paper we examine the relationship between the difference in the rates of return to assets reported to the shareholders and the IRS and the firm's ownership type, its capital structure, foreign activity, and other characteristics. Studying the book-tax difference in terms of rates of return on assets is important because, over the past two decades, the income reported by firms to the IRS has decreased while the financial income and the rates of return on assets reported to the shareholders has increased. The widening of the book-tax differences (BTD) in the 1990's and early 2000's is a possible indication of earnings management by corporations.

The prior literature studying the BTD in terms of income has found evidence of additional tax sheltering activity since the widening of the BTD can not be fully attributed to temporary and permanent differences or differences in consolidation. However, these works have been hampered by the lack of data. The financial statements provided by firms to the public and the tax returns reported to the IRS did not provide information on why the tax and book income increasingly differed. In a recent article Eames and Luttmann (2010) discuss the problems with trying to compute effective tax rates for corporations with publicly available information. They find that when analyzing tax rates estimated using Compustat, aggregate SOI, and GAO data can result in contradictory and incomplete results.

New tax reporting requirements for business entities have improved the potential for research using this data to reveal more about book-tax differences. The new Schedule M-3, required for corporations with total assets of \$10 million or more, reconciles the information on financial statements and the tax returns. On the M-3 firms are asked to report both worldwide consolidated net income and tax net income, amounts that may not be the same due to different book and tax consolidations, as well as to varying disclosures of which income and deduction items are temporary versus permanent.

Current literature using preliminary M-3 data has found that, on aggregate, the BTD exists and has reported some first information on the nature of the differences. A 2008 article by Boynton, DeFilippes, and Legel using preliminary tax year 2005 data found in the aggregate a large positive BTD. A 2007 article by Lisowsky and Trautman using firm level Schedule M-3 data for publicly traded companies found evidence of a strong positive relationship between differences in the rates of return on assets reported in the book and tax consolidations and the differences in the capital structure measures reported in the financial statements and the tax returns. Finally, a 2008 GAO report found that foreign controlled corporations reported lower tax liabilities than domestically controlled corporations.

While the book-tax literature is replete with evidence of an increasing divergence between what public corporations report for book versus tax purposes, nearly all early studies of this subject were seriously hampered by the quality and lack of data. The literature on trends in corporate effective tax rates, multinationals, and corporate tax planning suggests that temporary and permanent differences in book-tax treatment explain only part of the total difference and suggest further analysis of the differential use of the underlying assets. By choosing to perform an analysis of manufacturing based on a prior seminal work by Mills and Newberry (2001), we employ new data sources and expand the analysis to all manufacturing firms with end-of-year total

assets of \$10 million or more. The research goal is to broaden our understanding of the relationship between assets and income, and how this relationship differs between book and tax reporting.

For this work we use tax return data for tax years 2005 to 2008. As mentioned above, this allows us to take advantage of the first years of Schedule M-3 data. The challenge with using this data is that tax year 2005 was a year of record profits for this sector (largely due the Oil and Gas major group); during tax year 2007 many firms began experiencing the effects of the recession, which started officially in December of 2007 and did not end until June of 2009,¹ making atypical changes to asset holdings and valuations. Graham et al. (2010) have shown that overall economic activity is closely related to BTD (Graham et al., 2010, 21) therefore our finding of earning management should be fairly robust.

The rest of the paper proceeds as follows. Section 2 discusses the existing asset structure literature, in particular the BTD literature, and identifies findings and deficiencies in the literature. Section 3 discusses the data currently available and associated issues. Section 4 reports on the replication of the Mills and Newbury (2001) analysis for all manufacturing firms and describes our extended framework. Section 5 presents summary statistics for the full sample and by income and ownership type. Section 6 presents the results of the analysis. Finally, Section 7 presents our conclusions and offers recommendations for further research.

Literature Review

A large body of research has examined the differences in the asset structure of firms for evidence of tax sheltering activities. These works have tested the relationship between differences in the nature and physical location of firms' assets and differences in their revenues, rates of return on assets, and tax liability. Based on their scope and the empirical approach used, the asset structure literature can be divided into several streams. The common thread of the literature is the need to account for and interpret the widening of the book-tax differences.

Tax income is calculated following the Internal Revenue Code (IRC) while financial (book) income is calculated under the General Accepted Accounting Principles (GAAP) issued by the Financial Accounting Standards Board (FASB). The book-tax differences arise because income and expenses are treated differently under the IRC and the GAAP, but also because the two measures are reported for different purposes. Tax income is reported to the IRS and is used to determine the firm's tax liability, so corporate management has an incentive to report lower taxable income. Financial statements, on the other hand, are reported to the firm's shareholders and often to the public, for reporting corporate profits. Here, corporate management has a clear incentive to report higher financial income.

A number of authors have analyzed the causes of the BTD (see Plesko (2000, 2004), Boynton, DeFilippes, and Legel (2005 and 2008)). They found, as mentioned earlier, that the BTD widened significantly over the 1990s and the early 2000s.² The BTD differences come from a variety of sources. They include temporary differences, such as differences in allowable depreciation, which eventually reverse, and permanent differences, which do not reverse.

Temporary differences in allowable depreciation result from the use of different depreciation schedules for book and tax purposes. For example, under the IRC a firm can typically accelerate its depreciation deductions relative to the treatment under GAAP. The difference in timing of the available depreciation deduction reduces the firm's tax income in the short run. As long as the firm's depreciable assets are increasing, this book-tax difference should increase.

Permanent differences are more important to the IRS and the shareholders than temporary differences because they never reverse and permanently reduce tax income while increasing book income. An example of a permanent difference is non-qualified stock options that are expensed for tax purposes but not accounted for in financial statements. Firms that use stock options as a form of employee compensation can effectively keep significant amounts of wage expenses out of their financial statements without increasing their tax liability.³ As a second example, tax exempt interest is included in the financial income but not in the tax income. Third, differences may arise from the treatment of discontinued operations and other large "extraordinary" write-offs and expenses. The treatment of nonqualified stock options has received perhaps the most attention (see Manzon and Plesko, 2002; Desai, 2003; and Hanlon and Shevlin, 2005). Although these works found that firms

used stock options extensively in the 1990's they found evidence of additional tax sheltering activity since the widening of the BTD can not be fully attributed to temporary and permanent differences.

Another class of differences relates to the rules for consolidation of subsidiaries (see Mills, Newberry, and Trautman, 2002; Mills and Plesko, 2003; and Plesko, 2004). For financial purposes, a parent company must include in its consolidated financial statements all domestic and foreign subsidiaries for which it owns an interest of 50 percent or more. Under tax rules, however, domestic subsidiaries must be 80 percent or more owned to be included in the parent's tax return and foreign subsidiaries cannot be consolidated.

Another reason financial and tax data may differ is off-balance-sheet financing. Some firms have used special-purpose entities (SPEs) to keep debt outside their consolidated financial statements. SPEs that are 80 percent or more owned are included in the tax consolidation but not in the financial consolidation. Such entities are classified under FIN 46R and they do have to be included in the book consolidation (Lisowsky and Trautman 2007). Mills and Newberry (2005) find "that these financial reporting effects occurred primarily during 1994-1999." (Mills and Newberry 2005, 251) These works found evidence that the financial statements of large firms for that period underreported both interest paid and debt, and inflated book income while leaving tax income unchanged.

Finally, the BTD may exist because some companies in their tax returns did not properly eliminate intercompany assets, such as accounts payables and receivables, and dividends. By improperly eliminating intercompany assets, firms increase the assets reported on their tax returns while keeping tax income unchanged and hence understate their rates of returns on tax assets. By improperly eliminating intercompany dividends firms overstate book income while leaving tax income unchanged. Mills, Newberry, and Trautman (2002) report anecdotal evidence of such reporting issues.

Taken together, the BTD literature finds evidence that the BTD widened but does not fully explain all the reasons behind its growth. Data limitations have hampered this research. Previously, the financial statements provided by firms to the public and the tax returns reported to the IRS did not provide information on why the tax and book income increasingly differed. As Weiner (2007) points out, "the real problem with the book-tax income gap was not that it existed but that no one really knew why it existed and why it was growing" (Weiner 2007, 853).

To improve the quality and expand the information available to tax administrators starting in Tax Year 2004, the IRS introduced a new reconciliation schedule. The new Schedule M-3, required for corporations with total assets of \$10 million or more, further details the reconciliation of the information on financial statements and the tax returns. On the M-3, firms are asked to disclose if the book-tax differences for a large number of income and deduction items are temporary or permanent. Firms are also asked to reconcile their worldwide consolidated net income, reported on the SEC Form 10-K, with the net income for the tax consolidation.

As mentioned earlier, a 2008 article by Boynton, DeFilippes, and Legel, using tax year 2005 data, found that the BTD equaled \$15,440 million. For returns with a positive BTD they found a return on assets of 5.1 percent, while for returns with a negative BTD the return on assets was 1.7 percent. For tax year 2006 they found that the BTD was significantly larger at \$146,411 million and the return on assets was 3.5 and 0.6 percent respectively. We have found similar results for the manufacturing industry during this time period.

The Lisowsky and Trautman (preliminary 2007) article used tax year 2004 Schedule M-3 data. They examined the relationship between the book and tax rates of return on assets on 4,346 large public companies and their book and tax financial statements. They found at the firm level evidence of a strong positive relationship between differences in the rates of return reported in the book and tax consolidations and the differences in the capital structure measures reported in the financial statements and the tax returns.

Data Availability

The current study probes book-tax differences by using tax return data not previously available to researchers in the preceding decade. The sample is composed of companies that were selected by the SOI sampling process in each tax year from 2005 to 2008. The sample selection process is set up in such a manner that any corporation selected into the sample in a given year will be selected again the next year so it is possible to form both

unbalanced and balanced panels from the annual cross-sections. The advantage of the SOI data over other IRS datasets is that it provides more complete statistics. For example, all income statement, balance sheet, and Schedule M-3 fields are edited. In addition, SOI processing edits the data into consistent, standardized form that minimizes any “taxpayer reporting” noise in the data for analyses such as BTD.

To confine the data to medium and large sized manufacturing firms, we excluded all returns in five categories. First, we excluded all firms with end-of-year total assets of less than \$10 million. Second, we excluded all foreign-controlled firms so that all entities in the sample have similar characteristics and incentives. Third, foreign corporations that engaged in trade or business in the U.S. or had income from sources within the U.S.—which are required to file Form 1120F—were also excluded because SOI does not collect balance sheet information for such returns. Fourth, part-year returns were excluded because they report income and deduction amounts for the short tax period but the balance sheet data reflect full year amounts. Finally, we exclude from our sample a small number of firm-year observations with extreme values.⁴ The final dataset consisted of 17,794 firm-year observations for 6,480 corporations.

Econometric Modeling Framework

Mills and Newberry Framework

In their 2001 paper, Mills and Newberry (MN) developed an econometric model that utilizes many of the variables of interest. The authors had access to the IRS Coordinated Examination Program (CEP) data (primarily companies with end-of-year assets of \$500 million or more) for manufacturing firms covering tax years 1981-1996. CEP companies know that they can expect more audit scrutiny than the general population. Therefore, the authors argue that the CEP dataset allows for a more homogenous group of taxpayers in terms of reporting behavior; these taxpayers should be more inclined to reduce book-tax reporting differences since they are under constant audit. Effects found to be significantly different from zero for this group should provide strong evidence of the effects in the broader population of returns.

The CEP has been replaced by the Coordinated Industry Case (CIC) program, which operates in the same manner as CEP but includes a greater range of firms. There are seven criteria used for the identification of CIC Program returns, per IRM Exhibit 4.46.2-2, including total gross assets, total gross receipts, total number of operating entities, number of multiple industries, total foreign assets for all Forms 5471, total related transactions on Form 5471/5472, and total foreign taxes. Approximately, 8 percent of all firms in our sample are in the CIC program, while for firms with end-of-year assets of \$500 million or more 37 percent are CIC. Firms know that as their size, complexity, and foreign activity increase their chances of being in the CIC program. On the other hand, this population has passed through a set of filters that attempt to identify firms justifying a continual examination process. In meeting these criteria, there may be reason to suspect that BTD would be greater, despite the additional scrutiny. As such, it is unclear what to expect as to the direction of the effect of being in the CIC program.

MN’s work used book income reported on the Schedule M-1 of the Form 1120 corporate tax return, providing self-reported book income for both private and public firms. As mentioned previously, the IRS has collected book data since 2004 on a more comprehensive Schedule M-3, which we used for our analysis.

We had several objectives in choosing to replicate MN’s results. First, several control variables used by the authors were also identified in earlier analyses as important data partitions (Batson et al. 2010). Using a similar model, we could explore the importance of these variables in a multivariate regression framework. Second, the Schedule M-3 contains enormous detail of book income for both public and private firms⁵. While various sources exist to provide book data for public firms, researchers were often left to use costly and onerous surveys to collect this data for private firms. Even book data reported on public financial statements may differ from the book data for public firms as reported on Schedule M-3 for several reasons (e.g. different consolidations rules, or foreign subsidiaries). To the extent that Schedule M-3 data could be used to identify known effects, researchers should be able to exploit the greater detail provided to explore new relationships among book-tax reporting differences. Finally, by conducting our analysis on data from very recent tax years (2005-2008) and comparing it to the MN results using a decade or older data, it would be informative to see if

the significance levels and magnitudes of the effects have changed⁶. The model, which draws directly from the MN specification, can be expressed linearly for firm i in year t as follows:

$$\begin{aligned}
 \text{BTD}_{i,t} = & \beta_0 + \beta_1 \text{Public}_{i,t} + \beta_2 \text{Debt}_{i,t} + \beta_3 \text{Debt}_{i,t} * \text{Public}_{i,t} + \beta_4 \text{Debt}_{i,t} * \text{Distress}_{i,t} \\
 & + \beta_5 \text{FTC}_{i,t} + \beta_6 \text{CapInt}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Distress}_{i,t} + \beta_{9-11} \text{Year}_{i,t} + \beta_{12-32} \text{Major} \\
 & \text{Industry}_{i,t} + e_{i,t}
 \end{aligned}$$

BTD is the pretax book income from Schedule M-3⁷ less taxable income⁸ (before Net Operating Loss deduction), scaled by end-of-year total assets⁹. Public is a dummy variable equal to 1 if public¹⁰. Debt is the ratio of long-term debt to total assets. FTC is the foreign tax credit claimed by income firms scaled by assets. CapInt is a measure of capital intensity (net property, plant and equipment to assets). Size is the log of assets. Distress is the probability of bankruptcy using tax data to compute Ohlson's predictor model¹¹. BTD can be thought of as the difference in the book return-on-assets (ROA) versus the tax ROA for the tax consolidation.

Our Framework

The model again draws directly from MN's specification but we take advantage of the availability of Schedule M-3 data. We seek to better understand differences in ROA as reported for book and tax purposes. We test whether the relationship between BTD and ownership type and capital structure is the same even after controlling for temporary and permanent differences of key income and deduction items. We also test the sensitivity of the findings to other specifications of BTD. The model can be expressed linearly for firm i in year t as follows:

$$\begin{aligned}
 \text{BTD}_{i,t} = & \beta_0 + \beta_1 \text{Public}_{i,t} + \beta_2 \text{Debt}_{i,t} + \beta_3 \text{Debt}_{i,t} * \text{Public}_{i,t} + \beta_4 \text{Debt}_{i,t} * \text{Distress}_{i,t} \\
 & + \beta_5 \text{Amortization}_{i,t} + \beta_6 \text{Amortization}_{i,t} * \text{Public}_{i,t} + \beta_7 \text{Depletion}_{i,t} + \beta_8 \text{Depletion}_{i,t} * \\
 & \text{Public}_{i,t} + \beta_9 \text{Depreciation}_{i,t} + \text{Tax Exempt} \beta_{10} \text{Depreciation}_{i,t} * \text{Public}_{i,t} + \beta_{11} \text{FTC}_{i,t} \\
 & + \beta_{12} \text{CapInt}_{i,t} + \beta_{13} \text{Size}_{i,t} + \beta_{14} \text{Distress}_{i,t} + \beta_{15} \text{Federal Deferred Taxes}_{i,t} + \beta_{16} \text{Tax} \\
 & \text{Exempt Interest}_{i,t} + \beta_{17} \text{CIC}_{i,t} + \beta_{18} \text{Consolidated}_{i,t} + \beta_{19} \text{CIC*Consolidated}_{i,t} \beta_{20-23} \\
 & \text{Year}_{i,t} + \beta_{24-44} \text{Major Industry}_{i,t} + e_{i,t}
 \end{aligned}$$

BTD is the pretax book income from Schedule M-3 less taxable income (before the Net Operating Loss deduction), scaled by total assets¹². Amortization is temporary or permanent amortization of goodwill as reported on the 2005 Schedule M-3 Part III, Line 26. Depletion is temporary or permanent depletion as reported on Schedule M-3 Part III, Line 30. Depreciation is temporary or permanent depreciation as reported on Schedule M-3 Part III, Line 31. Federal Deferred Taxes are temporary or permanent deferred taxes as reported on Schedule M-3 Part III, Line 2. CIC variable is a dummy equal to one if the firm was a CIC firm. Consolidated is a dummy equal to one if the firm had consolidated subsidiaries.

We anticipate that both temporary and permanent differences in amortization of goodwill, depletion, and depreciation deductions are positively related to BTD, for both income and loss firms. As reported by Mark Jackson (2009), temporary depreciation differences are driven by earnings management and permanent depreciation differences by economic factors. The magnitude of the effects should be greater for temporary than permanent deductions since all three are typical examples of temporary differences that eventually reverse their effect on BTD.

For the tax exempt interest we again anticipate a positive relationship with BTD but with the permanent deductions having a greater effect since tax exempt interest permanently reduces taxable income. Finally, we are unsure about the relationship between the U.S. deferred income tax expense and BTD. A positive (negative) net deferred income tax expense, as reported on Schedule M-3, decreases (increases) book income while leaving tax income unchanged, hence decreasing (increasing) BTD. The effect of deferred tax expenses on BTD would depend on whether firms have net deferred tax liabilities or net deferred tax assets.¹³

In this set of regressions we also exclude the size variable because it is collinear with the debt variables, and we introduce two dummy variables that differentiate firms into three groups with similar incentives and ability to manage their book reporting. The first variable is a dummy equal to one if the firm was a CIC firm. The second variable is also a dummy equal to one if the firm had consolidated subsidiaries¹⁴. The third variable is the interaction of the two dummies. Again here we are unsure of the relationship between the variables and BTD. If CIC firms, as discussed by MN, are more inclined to reduce book-tax reporting differences, since they are under constant audit, the relationship will be negative. Else, if being selected in the CIC program is a reason to suspect earnings management by the firm, then the relationship will be positive.

Summary Statistics

The following two tables report summary statistics for the key variables for all Large Business & International (LB&I) manufacturing firms in the sample, covering tax years 2005 to 2008. Table 1 shows summary statistics for the full sample. The average book-tax difference over total assets for tax years 2005 to 2008 is -0.012, therefore the firms in the sample report on average negative book-tax differences. Separating BTD in its two components, we find that book ROA is -0.2 percent and tax ROA is 1.0 percent, with book ROA being more volatile than tax ROA. Finally, the firms in our sample have a fairly low debt-to-asset ratio, low probability for bankruptcy, and are capital intensive. We should caution the reader that these statistics are for the full sample, which includes firm-year observations with extremely high (low) ROA and debt-to-asset ratios.

TABLE 1: Summary Statistics for LB&I Manufacturing Firms, Tax Years 2005–2008†

Variable	Mean	Minimum	25th Pctl	Median	75th Pctl	Maximum
BTD/ASSETS	-0.012	-1	-0.024	-0.002	0.016	0.939
BOOK INCOME/ASSETS	-0.002	-2.927	-0.034	0.028	0.094	2.038
TAX INCOME/ASSETS	0.01	-2.707	-0.026	0.029	0.091	2.17
DEBT/ASSETS	0.28	0	0.05	0.192	0.413	5.859
FOREIGN TAX CREDIT	0.001	0	0	0	0	0.326
DISTRESS	0.07	0	0.001	0.005	0.026	1
CAPITAL INTENSITY	0.202	0	0.07	0.156	0.289	1
SIZE	17.824	16.118	16.591	17.276	18.546	27.82
TOTAL ASSETS*	1,054	10	16	32	113	**

* In millions of dollars. ** Amount deleted to prevent disclosure of taxpayer-specific information.

† Dataset consisted of 17,794 firm year observations for 6,480 corporations

Table 2 shows the average values for all key variables by income and ownership type. On average, the BTD of income firms is positive, 0.003, and for loss firms negative, -0.046. BTD is significantly higher for public than private income firms, 0.011 versus -0.001. The difference is primarily due to tax ROA, which is lower for public firms, 9.6 percent, than for private firms, 11 percent. For loss firms, book ROA, -24.0 percent, is significantly lower than tax ROA, -19.6 percent. Finally, income firms have lower long-term debt over assets ratios than loss firms, 0.246 versus 0.382, and lower probability of bankruptcy, 0.013 versus 0.204.

TABLE 2: Summary Statistics for LB&I Manufacturing Firms, by Income and Ownership Type

Variable	Income Firms				Loss Firms			
	All	Public	Private		All	Public	Private	
	Mean	Mean	Mean		Mean	Mean	Mean	
FIRM YEARS*	10,205	3,203	7,002		5,340	1,771	3,569	
BTD	0.003	0.011	-0.001	9.87**	-0.046	-0.066	-0.37	-6.71**
BOOK INCOME	0.108	0.107	0.109	-0.43	-0.242	-0.252	-0.239	-1.35
TAX INCOME	0.105	0.096	0.110	-5.36**	-0.196	-0.186	-0.202	1.9
DEBT	0.246	0.242	0.247	-0.33	0.382	0.326	0.41	-6.26**
DISTRESS	0.013	0.009	0.016	-5.57**	0.203	0.186	0.212	-2.79**
CAPINT	0.196	0.149	0.212	-19.84**	0.181	0.14	0.195	-12.11**
SIZE	18.567	20.263	17.733	83.2**	18.093	18.922	17.682	31.83**
TOTAL ASSETS**	2,096	5,834	112		558	1,202	82	

* Approximately 2,249 firms year observations did not satisfy the income or loss firm criteria and were excluded from these statistics.

**In millions of dollars

Findings

One limitation we faced in replicating MN's work was the lack of a long time-series dataset. The authors' 15 years of data allowed for a more robust analysis than we were able to undertake with four years of data. In contrast, we take advantage of the Schedule M-3 data. In addition, the SOI data we use provides statistics that are consistent and in a standardized form.

For replicating MN's analysis we chose to restrict the data to all Manufacturing sector firms with end-of-year assets of \$500 million or more¹⁵. As discussed earlier, such firms would typically have been included in the CEP sample (Mills and Newberry, 2001).

Like MN, we find significant effects for several key variables. Our results, shown with the original results, are summarized in Table 3 below. Overall, our findings for income firms match their findings fairly closely, while for loss firms we find weaker relationships. Public firms in a positive book and tax income position have larger BTD than do private firms, when controlling for capital structure, foreign activity, size, capital intensity, and probability of bankruptcy. This result supports the theory that capital market pressures provide financial-reporting incentives for managers of public firms with assets greater than \$500 million to report relatively higher book income during profitable periods. It is important to mention here that BTD in this framework can be thought of as the difference in ROA reported to the shareholders versus ROA reported to the IRS. However, for firms in loss positions, public firms do not report larger book losses than tax losses, as they did in the 1980's and early 90's. Therefore, managers of loss firms do not seem to maximize book losses. For the debt variable, we confirm that evidence exists that more leveraged income firms report larger book income (or smaller book losses) than tax income (or loss). This is most likely due to the additional scrutiny these firms face from creditors. It should be noted that the magnitudes of the Public and Debt coefficients for income firms are significantly higher than the coefficients estimated by MN. They interact debt and public, finding significant results, indicating that the effect of debt on BTD is reduced for public firms relative to private firms (as private firms face more binding constraints from debt.) MN also interact debt with the probability of bankruptcy and they find a positive relationship with BTD. We do match the authors' impact and significance levels for both interaction terms fairly well. We also find a strong negative effect for firms with foreign tax credits. As firms repatriate foreign earned income, taxable income increases, shrinking the book-tax reporting difference. Our year dummies support our earlier finding that over the 2005 to 2008 time period BTDs have decreased. This is in accordance with the findings of Graham, Raedy, and Shackelford (2010). They report that over the 1993 to 2008 time period book income exceeds tax income for all years, except 2001 and 2008.

Overall, we are encouraged to have found the anticipated relationship for the key variables in this broader group of firms¹⁶. We find this particularly encouraging given the unique exogenous influences taking place in the broader economy, and in the manufacturing sector particularly, during our observation years.

TABLE 3: Comparison of Regression Output to Mills and Newberry (MN)

Variable	Predicted Sign	Income Firms		Predicted Sign	Loss Firms	
		Current \$500 Million or more	MN		Current \$500 Million or more	MN
		Coefficient	Coefficient		Coefficient	Coefficient
		(T-statistic)	(T-statistic)		(T-statistic)	(T-statistic)
Ownership type:						
PUBLIC	+	0.028** (4.49)	0.0008** (3.08)	-	0.010 (0.58)	-0.025** (-2.91)
Debt constraints:						
DEBT	+	0.045** (3.06)	0.020** (2.65)	?	0.013 (0.48)	0.036 (1.94)
DEBT*PUBLIC	-	-0.060** (-3.78)	-0.023** (-2.72)	?	-0.035 (-1.15)	0.040* (2.44)
DEBT*DISTRESS	+	0.079* (1.82)	0.185** (8.45)	?	0.096 (1.26)	-0.007 (-0.35)
Control variables						
FTC	-	-1.090** (-2.98)	-1.332** (-30.51)		NA	NA
CAPINT	?	0.010 (0.90)	0.010* (1.99)	?	0.061** (2.34)	0.002 (0.09)
SIZE	?	0.005** (3.52)	0.001* (2.00)	?	-0.007* (-1.85)	-0.009** (-4.79)
DISTRESS	?	-0.090** (-3.21)	-0.254** (-10.86)	?	-0.339** (-4.1)	-0.134** (-8.24)
YEAR 2006		-0.022** (-5.78)	Not reported		0.008 (0.94)	Not reported
YEAR 2007		-0.017** (-3.64)	Not reported		0.004 (0.37)	Not reported
YEAR 2008		-0.017** (-3.93)	Not reported		-0.046** (-3.34)	Not reported
Industry Dummies		Yes	Yes		Yes	Yes
Observations		2,021	4,956		566	820
Firms		779			346	
Adjusted R-squared		0.08	0.26		0.23	0.23

**,* The t-statistic is significant at the 0.01, 0.05 level respectively. OLS standard errors corrected for clustering by firm.

Next, we proceed to expand our analysis to the full sample of manufacturing firms. Table 4 reports findings for the full sample and also for firms with end-of-year assets less than \$500 million. The public coefficients for both groups of income (loss) firms are positive (negative) and statistically significant. Therefore, these results provide evidence that capital market pressures provide financial-reporting incentives for managers of even smaller sized public firms to report relatively higher book income during profitable periods, and to maximize book losses during loss periods. We also find a strong negative effect for firms with foreign tax credits. For the debt variables, the coefficients have the expected sign but only the debt interacted with the probability of bankruptcy is statistically significant. Therefore, in the 2005 to 2008 time period it is not evident that highly leveraged firms report larger book income (or smaller book losses) than tax income (or loss).

Next we report the regression results of the expanded framework where, in addition to the ownership type, capital structure, and foreign activity controls, we also take advantage of the temporary and permanent differences of key items as reported on Schedule M-3. Table 5 reports the findings for two groups of firms: the full sample and firms with end-of-year assets of \$500 million or more. As expected, the majority of temporary differences of amortization of goodwill, depletion, and depreciation are positively and significantly related to

BTD while permanent differences have the expected sign but are not statistically significant. Extrapolating from the Jackson (2009) finding, this could indicate significant earnings management by manufacturing firms. The opposite is true for tax exempt interest income, which showed permanent differences only, as expected, and are statistically significant. Moreover, both temporary and permanent U.S. deferred tax expenses for income firms have a negative and statistically significant effect on BTD, so income firms have net deferred tax liabilities. For loss firms, the signs differ but the coefficients are statistically significant at the 5 percent level.

TABLE 4: Regression Output for All Firms and Firms with Assets of less than \$500 Million

Variable	Predicted Sign	Income Firms		Predicted Sign	Loss Firms	
		Full Sample	Less than \$500 Million		Full Sample	Less than \$500 Million
		Coefficient (T-statistic)	Coefficient (T-statistic)		Coefficient (T-statistic)	Coefficient (T-statistic)
Ownership type:						
PUBLIC	+	0.011** (.4.03)	0.009** (2.86)	-	-0.023** (-2.91)	-0.024** (-2.91)
Debt constraints:						
DEBT	+	0.001 (0.29)	-0.0003 (-0.08)	?	-0.008 (-0.90)	-0.007 (-0.73)
DEBT*PUBLIC	-	-0.010 (-1.32)	0.002 (0.13)	?	-0.001 (-0.06)	-0.006 (-0.25)
DEBT*DISTRESS	+	0.009 (0.82)	0.009 (0.78)	?	0.026* (1.76)	0.026* (1.70)
Control variables						
FTC	-	-1.300** (-5.35)	-1.420** (-4.45)		NA	NA
CAPINT	?	0.001 (0.20)	0.0004 (0.09)	?	0.023* (1.75)	0.023* (1.79)
DISTRESS	?	-0.026 (-1.54)	-0.021 (-1.19)	?	-0.172** (-12.57)	-0.170** (-12.27)
SIZE		0.003** (4.86)	0.002* (2.33)		-0.006** (-3.53)	-0.010** (4.03)
TAX YEAR DUM.		YES	YES		YES	YES
INDUSTRY DUM.		YES	YES		YES	YES
Observations		10,203	8,182		5,339	4,773
Firms		4,405	3,710		3,063	2,766
Adjusted R-squared		0.06	0.06		0.13	0.13

**, * The t-statistic is significant at the 0.01, 0.05 level respectively. OLS standard errors corrected for clustering by firm.

Finally, we find evidence that CIC income firms, as well as CIC firms that have consolidated subsidiaries, report higher BTD. We find that consolidated firms in general report less BTD than non-consolidated firms. This is an interesting finding because it seems to contradict the MN assumption that firms in CEP/CIC type programs behave as if they expect to be audited more frequently and closely than the rest of the corporate population. This finding may be due to the fact that large firms have more opportunity to manage their BT reporting (Dyreng et al., 2008) and that CIC firms are in the program because they have greater need for thorough examination. For firms in loss positions the CIC and the interaction coefficients are not statistically significant, while the consolidated firms reported higher book tax differences than non-consolidated firms.

TABLE 5: Regression Output of Expanded Framework for All Firms and Firms with Assets of \$500 Million or More

Variable	Income Firms				Loss Firms	
	Predicted Sign	Full Sample	\$500 Million or more	Predicted Sign	Full Sample	\$500 Million or more
		Coefficient (T-statistic)	Coefficient (T-statistic)		Coefficient (T-statistic)	Coefficient (T-statistic)
Ownership type:						
PUBLIC	+	0.013** (5.58)	0.027** (4.11)	-	-0.013* (-1.73)	0.036* (2.13)
Debt constraints:						
DEBT	+	0.0004 (0.11)	0.045** (2.78)	?	0.002 (0.26)	0.003 (0.17)
DEBT*PUBLIC	-	-0.011 (-1.48)	-0.065** (3.61)	?	-0.017 (-0.86)	-0.043 (-1.62)
DEBT*DISTRESS	+	0.008 (0.68)	0.044 (0.88)	?	0.016 (1.12)	0.049 (0.75)
Temporary						
AMORTIZATION	+	0.532** (5.69)	0.159 (0.35)	+	0.884** (19.15)	0.887** (6.28)
AMORT*PUBLIC		0.003 (0.02)	0.421 (0.81)		0.029 (0.27)	-0.032 (-0.2)
DEPLETION	+	0.836** (9.19)	0.893** (9.24)	+	-0.609 (-1.11)	-60.133 (-0.46)
DEPL*PUBLIC		1.503 (0.90)	-2.586 (-1.26)		-2.282 (-0.14)	-63.776 (-0.49)
DEPRECIATION	+	0.545** (8.00)	0.263* (1.73)	+	0.914** (6.74)	0.870** (2.53)
DEPR*PUBLIC		-0.45* (-2.13)	-0.041 (-0.17)		-0.150 (-0.58)	0.037 (0.07)
TAX EXEMPT INTEREST	+	0.050 (0.20)	0.232 (1.56)	+	0.857 (1.07)	4.724 (1.25)
DEFERRED TAXES	-	-0.714** (-3.16)	-0.634** (-3.60)	-	0.206* (1.74)	-2.74* (-1.78)
Permanent						
AMORTIZATION	+	0.815** (6.45)	1.643** (5.49)	+	1.027** (21.05)	1.048** (5.29)
AMORT*PUBLIC		-0.454 (-0.94)	-0.788 (-1.60)		-0.334* (-2.15)	-0.111* (-0.54)
DEPLETION	+	0.573 (1.24)	-0.497 (-0.14)	+	-4.672 (-1.21)	-337.15** (-10.26)
DEPL*PUBLIC		-0.326 (-0.46)	0.475 (0.13)		11.371** (3.26)	341.71** (10.56)
DEPRECIATION	+	-0.010 (-0.01)	1.686 (0.66)	+	6.306* (2.24)	23.227** (2.66)
DEPR*PUBLIC		-23.68 (-1.25)	1.337 (0.10)		-4.587 (-1.13)	-19.697* (-1.91)
TAX EXEMPT INTEREST	+	0.422* (1.78)	1.639* (1.94)	+	0.454* (2.02)	0.172 (0.24)
DEFERRED TAXES	?	-0.505** (-3.66)	-1.059** (-4.60)	?	-0.370* (-2.30)	0.260* (0.53)

Footnotes at end of table.

TABLE 5: Regression Output of Expanded Framework for All Firms and Firms with Assets of \$500 Million or More—Continued

Variable	Income Firms			Loss Firms		
	Predicted Sign	Full Sample	\$500 Million or more	Predicted Sign	Full Sample	\$500 Million or more
		Coefficient (T-statistic)	Coefficient (T-statistic)		Coefficient (T-statistic)	Coefficient (T-statistic)
Control variables						
FTC	-	-1.320** (-5.36)	-1.019** (-3.42)	-	NA	NA
CAPINT	?	-0.003 (0.75)	-0.006 (-0.39)	?	0.01 (0.94)	-0.005 (-0.18)
DISTRESS	?	-0.028 (-1.68)	-0.098** (-2.93)	?	-0.131** (-10.54)	-0.224** (-3.28)
CIC	?	0.007* (1.84)	0.007 (1.61)	?	-0.007 (-0.48)	-0.029* (1.80)
CONSOLIDATED	?	-0.002 (-1.36)	-0.006 (-1.15)	?	0.010** (2.65)	-0.006 (-0.75)
CIC*CONSOL.	?	0.023** (3.67)	0.015* (2.25)	?	-0.0003 (-0.75)	0.009 (0.66)
TAX YEAR DUM.		YES	YES		YES	YES
INDUSTRY DUM.		YES	YES		YES	YES
Observations		10,203	2,021		5,339	566
Firms		4,405	779		3,063	346
Adjusted R-squared		0.10	0.13		0.32	0.52

**, * The t-statistic is significant at the 0.01, 0.05 level respectively. OLS standard errors corrected for clustering by firm.

Conclusion

We find confirmation that use of Schedule M-3 data for both publicly traded and privately held companies illuminates differences in the return on assets ratios estimated using book and tax data. We also qualitatively replicate MN's primary findings using M-3 data and extend the primary relationship beyond the Manufacturing CEP population to cover the entire Manufacturing sector of the LB&I population. We further extend this work by attempting to identify the contributions of identifiable temporary and permanent differences along with the contribution of the firms' financial structure and other characteristics in estimating otherwise unexplained book-tax differences. We think these three findings are important for better understanding book-tax differences.

First, the Schedule M-3 potentially provides enormous detail about private firms' book income, previously achievable only through surveys. Moreover, the designation of ownership can be more strictly applied, eliminating the difficulties of matching to public datasets. By combining Schedule M-3 data with a proven econometric model to confirm many well-developed theories in the book-tax literature, future researchers should be encouraged to use this dataset for more detailed research. However, as we discovered, Schedule M-3 reporting is only as good as taxpayer reporting and SOI cleaning. As researchers move away from totaled fields (particularly ones that should match the Form 1120 income statement), the data become sparse. In fact, out of the 24 lines on the Schedule M-3, Part II that are available for taxpayers to report book income, for every one dollar reported in itemized lines 1-24, ten dollars are reported in the catch-all "Other income items" field¹⁷. Based on descriptions supplied by taxpayers, many of the large items reported on this line match up to a line already on the Schedule M-3¹⁸. With the availability of M-3 electronic data for most LB&I firms, we believe much value could be added to this dataset if SOI could identify and allocate items shown in "other income" to more appropriate fields. SOI applies similar perfection to "other" fields found on income and deduction statements as well as balance sheets. Additional perfection of this sort should ensure future researchers have a richer dataset.

Second, we qualitatively replicate the earlier work by MN on the entire LB&I population, rather than only on CEP/CIC returns. It is encouraging that the broad conclusions of MN were found to exist in the more

diverse LB&I manufacturing population. We hope that as more years of data become available, research will be conducted on minor industries within this group, incorporating additional variables into the model that highlight unique reporting features.

Third, we provide evidence that even after controlling for temporary and permanent differences of key items as reported on Schedule M-3, the ownership type and capital structure finding are still robust. We also provide evidence that CIC income firms, as well as CIC firms that have consolidated subsidiaries, report higher BTB.

We've demonstrated that the current state of research on book-tax differences can be furthered by revisiting the research on publicly traded companies and by expanding the scope of the research to privately held LB&I business entities. Our study opens the door for future analysis of asset structures to reveal why BTB exists. We've discussed several reasons to use new data sources, in particular to draw out differences in public vs. private firm behaviors.

What else might matter? Other unexplored but compelling "predictors" of BTB are expected to further explain the reporting differences. We briefly discuss three areas we believe are ripe for further research. These areas cover temporary and permanent differences, as well as an attempt to increase our understanding of remaining and otherwise unexplained differences:

1. Intangibles/assets ratio. The literature suggests that rates of return to assets may not be meaningful indicators of what tax should fall out from income streams that are based in part on book value of intangible assets (Hulten and Hao, 2008). Among chemicals firms for example, as much as 10% of total assets are amortized intangibles. The taxable amount is difficult to discern from tax or book reporting, although Schedule M-3 data help. One possible way to get a better idea of the role that intellectual property plays in BTB is to examine patent assignor/assignee data and collaboration or marketing agreements between U.S. companies and foreign subsidiaries.

2. Foreign control of assets and extent of firm's foreign operations. Empirical evidence of income shifting by multinational companies provides impetus to explore these relationships further. Preliminary analysis of Physical Plant & Equipment (PP&E) return on assets by chemicals firms suggests that a considerable amount of tax revenue is at risk for underreporting by multinationals heavily engaged in moving profits offshore. Profit-maximizing companies "park" both real and intangible assets to take advantage of lower tax rates in other countries. The trend among large U.S. drug companies is rapid growth in profits earned offshore in relation to domestic profits due to transfer pricing (Martin Sullivan, 2008). This presents a compelling area for further analysis.

3. Aggressive Tax Behavior. Finally, BTB analysis begs the question of how far these differences are manifested in aggressive tax behavior. More needs to be done to get to the root cause of behaviors that lead to a wider corporate tax gap. Hanlon and Heitzman (2009) bemoan the "lack of good structural models of book-tax differences and effective tax rates" pointing out that studies are plagued by the perpetual chicken-and-egg story: do taxes paid impact decisions as first-order "drivers" of behavior, or are they simply the byproduct doomed to remain buried in the residual term of regression analyses?

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Endnotes

- ¹ US Business Cycle Expansions and Contractions. www.nber.org/cycles.html
- ² Hanlon and Shevlin (2002) and Plesko (2004) reported a negative book-tax gap in 2001 but the gap turned positive again in 2002 and reached new heights in 2003.
- ³ As of December 31, 2004 FASB 123R no longer allows this practice.
- ⁴ This included 16 observations with debt to asset ratios greater than 6 and 131 observations with BTDT greater than end-of-year total assets
- ⁵ Additionally, the Schedule M-3 specifically asks about whether the firm is traded on an exchange or filed a 10-K. Previous studies relied on matching firms by EIN to public datasets as the way to determine ownership. It is quite common to have many mismatches, classifying public firms as private. Schedule M-3 data should allow for a more accurate determination of ownership type. There are, of course, reporting issues by taxpayers on these fields. For example, in the four-year period we examined, about 4% of firms "changed" ownership status at least once. Much of this could be real, but some could also be artifacts in the data (e.g., taxpayers simply not checking the 10-K box or listing a CUSIP). In this exercise we coded firms as public in all four years if they declared public in one. We also reran the data, coding firms as public only in the year for which we had information. The results were nearly unchanged.
- ⁶ Pretax book income is the net book income for tax entities (filed on Schedule M-3 Part I, Line 11) plus U.S. current income tax expense (filed on Schedule M-3 Part III, line 1).
- ⁷ Net Income from Form 1120, line 28 is reduced by special deductions. Special deductions eliminate the total dividends reported on Schedule C, line 19, and have been brought forward to page 1, line 4, so they are included in gross income and tax net income. Since taxable income cannot be negative and since tax net income does not include special deductions we elected to use as the main tax income variable the difference between tax net income and special deductions.
- ⁸ End-of-year total assets is the only measure of assets reported on corporate tax returns. Total assets are reported on Form 1120 Schedule L balance sheet, line 15(d). Per taxpayer instructions all Schedule L items should be calculated under GAAP and they should follow the tax rules for consolidation of subsidiaries. Items reported on Schedule L, Income Statement, and Schedule M-3 should reconcile.
- ⁹ Following the convention of Boynton, DeFilippes, and Legel (2008), a firm is labeled public if on the M-3 they either indicate they are publicly traded or filed a 10-K.
- ¹⁰ Ohlson (1980) uses a logistic function to model the probability of bankruptcy, using several income and asset variables from current and prior years. Many users of this model apply the original coefficients derived from the work (using a 1970s dataset), to updated variables. Another standard bankruptcy model calculates a Z-score, based on work by Edward Altman in 1968. Hillegeist (2004) describes many of the concerns with using the decades-old estimates from these models. For consistency of replication, we used followed Mills' and Newberry's use of Ohlson's model, but future work should find a better predictor.
- ¹¹ We also tested an alternative specification for BTDT, where BTDT is equal to the sum of temporary and permanent difference reconciliation totals reported on Schedule M-3 lines 30 (b) and (c) plus U.S. current income tax expenses (reported on Schedule M-3 Part III, line 1 (b) and (c)) scaled by total assets. In addition, we separated BTDT into temporary and permanent, again using Schedule M-3 lines 30(b) and (c), scaled by total assets and used as our dependent variable.
- ¹² A deferred tax liability is a tax obligation that will be paid in future taxes, while a deferred tax asset is a tax benefit that will occur in future years.

- ¹³ For this variable we take advantage of information provided on Schedule M-3.
- ¹⁴ As mentioned earlier, the CEP program has been replaced by the CIC program, which includes firms from a greater range of size. That, in addition to having only four years of Schedule M-3 data available, leads us to expand our dataset to Manufacturing sector firms with end-of-year assets of \$500 million or more. We believe that this group of firms is the closest approximation to the CEP firm sample used by MN, for the 2005 to 2008 time period.
- ¹⁵ The findings remain robust even when we use the alternative definition of BTD. When we separate BTD into temporary and permanent, the findings are much weaker, particularly for the temporary BTD. We show the output from the latter regressions in Appendix A.
- ¹⁶ Note that this excludes, of course, amounts associated with cost of goods sold.
- ¹⁷ Boynton, DeFilippes, and Legel (2008) investigate and allocate some of the largest amounts found in this line. This process, however, is tedious and dependent on each researcher creating a dictionary of terms to search for and move. They also note several large, recurring items in the “other” field that indicate the need for new M-3 lines.
- ¹⁸ Graham et al. in their 2010 paper that reviews the research on accounting for income taxes, which includes the MN paper, show that if researchers rely on ordinary least squares (OLS) and White standard errors, they risk underestimating standard errors and overestimating the statistical significance of the coefficients. The reason is the OLS assumption of identically and independently distributed errors, which is violated when residuals are correlated through time or across firms. In our research, we adjust for this correlation by clustering standard errors.

Appendix A: Regression Output for Firms with Assets of \$500 Million or More

Variable	Income Firms			Loss Firms		
	Predicted Sign	Temporary	Permanent	Predicted Sign	Temporary	Permanent
		Coefficient (T-statistic)	Coefficient (T-statistic)		Coefficient (T-statistic)	Coefficient (T-statistic)
Ownership type:						
PUBLIC	+	0.003 (0.62)	0.018** (3.27)	-	0.035* (1.84)	0.002 (0.11)
Debt constraints:						
DEBT	+	0.010 (0.91)	0.033* (2.09)	?	0.052 (1.32)	-0.019 (-1.06)
DEBT*PUBLIC	-	-0.013 (-0.95)	-0.046** (2.75)	?	-0.062* (-1.53)	-0.019 (-0.92)
DEBT*DISTRESS	+	0.067* (2.34)	-0.004 (-0.13)	?	-0.162 (-1.32)	0.182** (3.44)
Control variables						
FTC	-	0.052 (0.35)	-1.596** (-5.86)		NA	NA
CAPITAL INTENSITY	?	-0.005 (-0.34)	-0.008 (-0.66)	?	-0.061 (-1.08)	0.346* (2.07)
DISTRESS	?	-0.034 (-1.27)	-0.034* (2.00)	?	-0.84* (1.78)	-0.247** (-3.51)
CIC		0.005 (1.19)	0.005 (1.49)		-0.002 (-0.15)	-0.001 (-0.11)
CONSOLIDATED		-0.004 (-1.35)	0.003 (0.54)		-0.14 (0.95)	-0.003 (-0.23)
CIC*CONSOL.		0.005 (0.15)	-0.001 (-0.22)		-0.004 (-0.19)	-0.0006 (0.10)
TAX YEAR DUM.		YES	YES		YES	YES
INDUSTRY DUM.		YES	YES		YES	YES
Observations		2,022	2,022		567	567
Firms		779	779		347	374
Adjusted R-squared		0.04	0.13		0.23	0.21

**,* The t-statistic is significant at the 0.01, 0.05 level respectively. OLS standard errors corrected for clustering by firm.